GV-N98TGR-512I

NVIDIA® GeForce™ 9800 GT Graphics Accelerator

User's Manual

Rev. 101

12MM-N98TG5I-101R

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Notice

Please do not remove any labels on this graphics card. Doing so may void the warranty of this card.

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We, Manufacturer/Importer
(full address)

G.B.T. Technology Trading GMbH
Bullenkoppel 16, 22047 Hamburg, Germany

declare that the product
(description of the apparatus, system, installation to which it refers)

VGA Card
GV-N98TGR-512I

is in conformity with
(reference to the specification under which conformity is declared)
in accordance with 2004/108/EC EMC Directive

☐ **EN 55011**	Limits and methods of measurement of radio disturbance characteristics of industrial, scientific and medical (ISM) high frequency equipment	☒ **EN 61000-3-2**	Disturbances in supply systems caused
		☒ **EN 61000-3-3**	Disturbances in supply systems caused by household appliances and similar electrical equipment "Voltage fluctuations"
☐ **EN 55013**	Limits and methods of measurement of radio disturbance characteristics of broadcast receivers and associated equipment	☒ **EN 55024**	Information Technology equipment-Immunity characteristics-Limits and methods of measurement
☐ **EN 55014-1**	Limits and methods of measurement of radio disturbance characteristics of household electrical appliances, portable tools and similar electrical apparatus	☐ **EN 50082-1**	Generic immunity standard Part 1: Residual, commercial and light industry
		☐ **EN 50082-2**	Generic immunity standard Part 2: Industrial environment
☐ **EN 55015**	Limits and methods of measurement of radio disturbance characteristics of fluorescent lamps and luminaries	☐ **EN 55014-2**	Immunity requirements for household appliances tools and similar apparatus
☐ **EN 55020**	Immunity from radio interference of broadcast receivers and associated equipment	☐ **EN 50091- 2**	EMC requirements for uninterruptible power systems (UPS)
☒ **EN 55022**	Limits and methods of measurement of radio disturbance characteristics of information technology equipment		
☐ **DIN VDE 0855** ☐ **part 10** ☐ **part 12**	Cabled distribution systems; Equipment for receiving and/or distribution from sound and television signals		

☒ **CE marking** CE (EC conformity marking)

The manufacturer also declares the conformity of above mentioned product with the actual required safety standards in accordance with LVD 2006/95/EC

☐ **EN 60065**	Safety requirements for mains operated electronic and related apparatus for household and similar general use	☒ **EN 60950**	Safety for information technology equipment including electrical business equipment
☐ **EN 60335**	Safety of household and similar electrical appliances	☐ **EN 50091-1**	General and Safety requirements for uninterruptible power systems (UPS)

Manufacturer/Importer

(Stamp)

Date : Apr.30,2009

Signature : Timmy Huang

Name : Timmy Huang

DECLARATION OF CONFORMITY

Per FCC Part 2 Section 2.1077(a)

Responsible Party Name: G.B.T. INC. (U.S.A.)

Address: 17358 Railroad Street
City of Industry, CA 91748

Phone/Fax No: (818) 854-9338/ (818) 854-9339

hereby declares that the product

Product Name: VGA Card

Model Number: GV-N98TGR-512I

Conforms to the following specifications:

FCC Part 15, Subpart B, Section 15.107(a) and Section 15.109 (a),Class B Digital Device

Supplementary Information:

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful and (2) this device must accept any inference received, including that may cause undesired operation.

Representative Person's Name: ERIC LU

Signature: Eric Lu

Date: Apr.30,2009

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1. Introduction

1.1. Features

- Powered by NVIDIA® GeForce™ 9800 GT Graphics Processing Unit (GPU)
- Supports PCI Express 2.0
- Integrated with 512MB GDDR3 memory (For GV-N98TGR-512I only)
- Supports DirectX 10
- Supports NVIDIA® SLI™ (Scalable Link Interface) technology (Note)
- Supports 1 HDMI connector
- Supports 1 D-Sub connector
- Supports 1 DVI-I connectors
- Supports HDCP (High-Bandwidth Digital Content Protection) technology

1.2. Minimum System Requirements

- Hardware
  - Intel® Pentium®/Core™ 2 or AMD Athlon™/Phenom™
  - 128 MB of system memory; 2 GB or more for best performance
  - Optical drive for software installation (CD-ROM or DVD-ROM drive)
  - A 450 Watt power supply or above is a must

- Operating System
  - Windows® Vista
  - Windows® XP with Service Pack 2 (SP2)
  - Windows® XP Professional x64 Edition

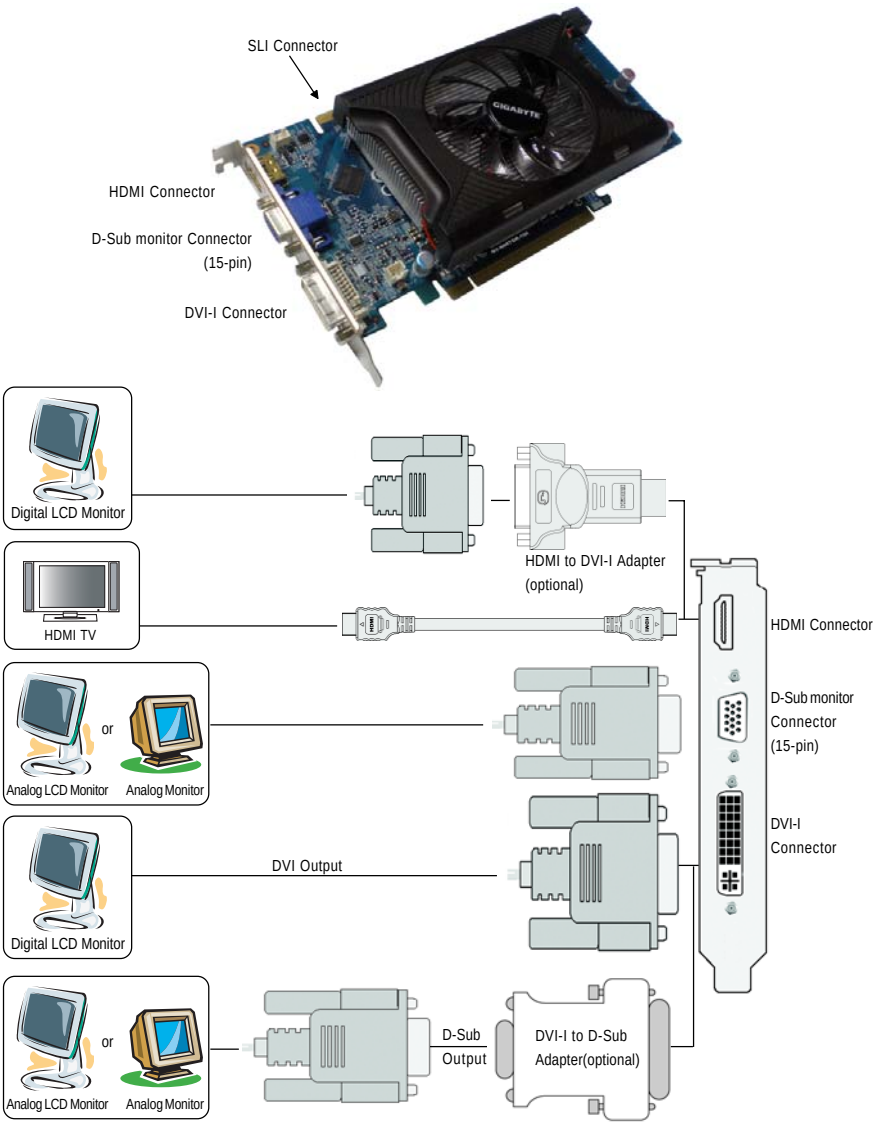
- SLI™ Configuration

  If you are planning on using this graphics card as part of an SLI system, the following are required:
  - An SLI certified motherboard with two PCI Express x16 slots and correct chipset driver
  - Two GV-N98TGR-512I
  - A power supply with 550-watt or above is recommended
  - An SLI bridge connector

(Note) SLI technology requires a PCI Express motherboard with two x16 physical connectors. Graphics cards working in an SLI configuration must be with the same model name (e.g. GV-N98TGR-512I) and from the same vendor (e.g. GIGABYTE TECHNOLOGY).

2. Hardware Installation

2.1. Board Layout



Expansion cards contain very delicate Integrated Circuit (IC) chips. To protect them against damage from static electricity, you should follow some precautions whenever you work on your computer.

1. Turn off your computer and unplug power supply.
2. Use a grounded wrist strap before handling computer components. If you do not have one, touch both of your hands to a safely grounded object or to a metal object, such as the power supply case.
3. Place components on a grounded antistatic pad or on the bag that came with the components whenever the components are separated from the system.

The card contains sensitive electric components, which can be easily damaged by static electricity, so the card should be left in its original packing until it is installed.

Unpacking and installation should be done on a grounded anti-static mat. The operator should be wearing an anti-static wristband, grounded at the same point as the anti-static mat.

Inspect the card carton for obvious damage. Shipping and handling may cause damage to your card. Be sure there are no shipping and handling damages on the card before proceeding.

- DO NOT APPLY POWER TO YOUR SYSTEM IF THE GRAPHICS CARD IS DAMAGED.
- In order to ensure that your graphics card can work correctly, please use official GIGABYTE BIOS only. Using non-official GIGABYTE BIOS might cause problem(s) on the graphics card.

2.2. Hardware Installation

Now that you have prepared your computer, you are ready to install your graphics card.

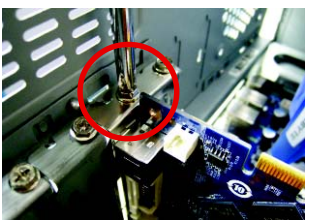
Step 1.

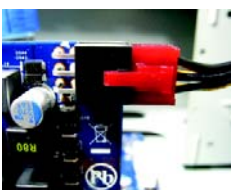
Locate the PCI Express x16 slot. If necessary, remove the metal cover from this slot; then align your graphics card with the PCI Express x16 slot, and press it in firmly until the card is fully seated.

NOTE Make sure that the gold edge connector of the graphics card is securely inserted.

Step 2.

Replace the screw to fasten the card in place, and replace the computer cover.





CAUTION

After installation, remember to connect the power cable to your graphics card, or the system will not boot. Do not touch the card when it's operating to prevent system instability.

Step 3.

Plug the display cable into your card; then turn on the computer and monitor. To connect a D-Sub monitor to your graphics card, use the D-Sub connector. To connect a flat panel display to your graphics card, use the DVI-I connector. To connect an HDMI monitor to your graphics card, use the HDMI connector.

To HDMI Monitor

To D-Sub Monitor

To Flat Panel Display

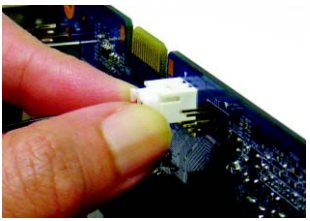
Connect an HDMI monitor

Connect a D-Sub monitor

Connect a flat panel display

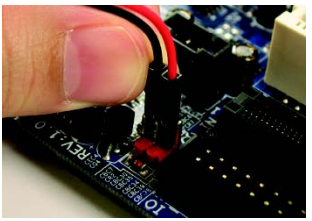
Step 4.

To connect an HDMI TV, follow the steps below to enable the S/PDIF in function for the graphics card.



1.

Connect the provided S/PDIF cable to the graphics card.



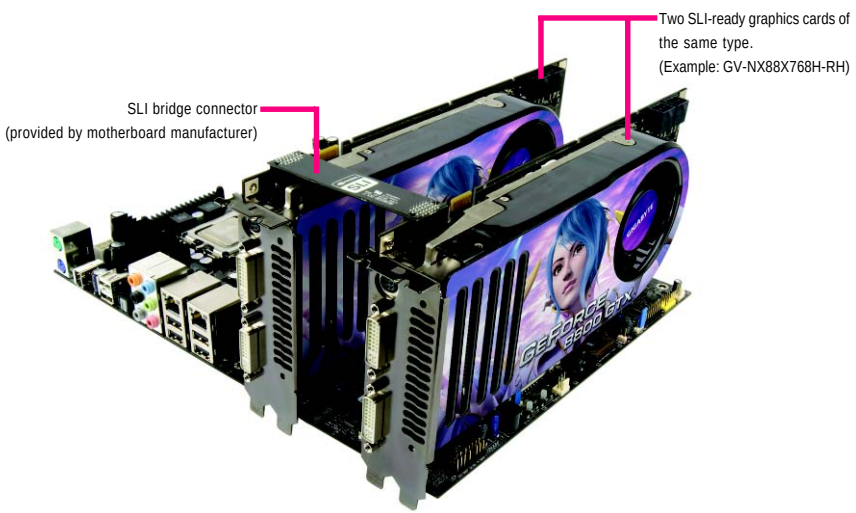
2.

Connect the S/PDIF cable to the motherboard. (the red wire connects to the S/PDIF out pin and the black to the Ground pin)

You are now ready to proceed with the installation of the graphics card driver. Please refer to next chapter for detailed instructions.

How NVIDIA® SLI™ (Scalable Link Interface) technology works:

In an SLI configuration, two SLI-ready graphics cards of the same model and the same manufacturers are connected together via SLI bridge connector in a system that provides two x16 PCI Express slots to scale graphics performance. The picture below shows that two graphics cards are linked in parallel in an SLI configuration.


Two SLI-ready graphics cards of the same type.
(Example: GV-NX88X768H-RH)
SLI bridge connector
(provided by motherboard manufacturer)

3. Software Installation

Notice the following guidelines before installing the drivers:

1. First make sure your system has installed DirectX 9 or later version.
2. Make sure your system has installed the appropriate motherboard drivers (for the motherboard drivers, please contact the motherboard manufacturer.)

3.1. Driver and Utility Installation

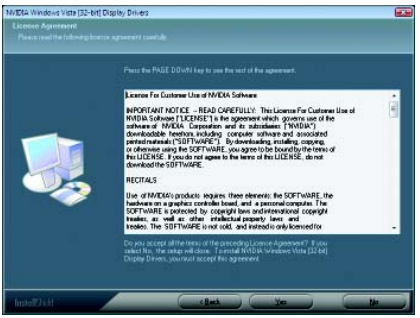
3.1.1. Driver Installation

After installing the operating system, insert the driver disk into your optical drive. The driver Autorun screen is automatically displayed which looks like that shown in the screen shot below. (If the driver Autorun screen does not appear automatically, go to My Computer, double-click the optical drive and execute the setup.exe program.)

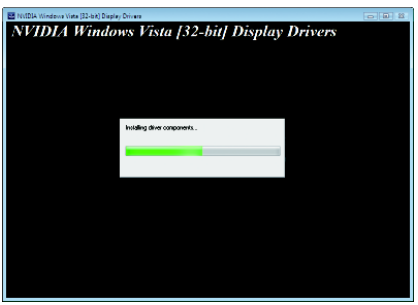
Step 1:
Click the Install Display Driver item.

Step 2:
Click the Next button.

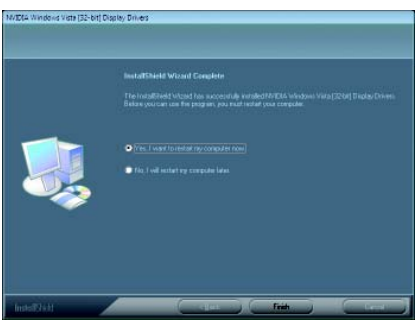
NOTE For software MPEG support in Windows XP, you must install DirectX first. Users who run Windows XP with Service Pack 2 or above do not need to install DirectX separately.


NVIDIA Windows Vista [32-bit] Display Drivers
License Agreement
Please read the following license agreement carefully.
Press the PAGE DOWN key to see the rest of the agreement.
License For Customer Use of NVIDIA Software
IMPORTANT NOTICE -- READ CAREFULLY: This License For Customer Use of NVIDIA Software ("LICENSE") is the agreement which governs use of the software of NVIDIA Corporation and its subsidiaries ("NVIDIA") downloadable herefrom, including computer software and associated printed materials ("SOFTWARE"). By downloading, installing, copying, or otherwise using the SOFTWARE, you agree to be bound by the terms of this LICENSE. If you do not agree to the terms of this LICENSE, do not download the SOFTWARE.
RECITALS
Use of NVIDIA's products requires three elements: the SOFTWARE, the hardware on a graphics controller board, and a personal computer. The SOFTWARE is protected by copyright laws and international copyright treaties, as well as other intellectual property laws and treaties. The SOFTWARE is not sold, and instead is only licensed for
Do you accept all the terms of the preceding License Agreement? If you select No, the setup will close. To install NVIDIA Windows Vista [32-bit] Display Drivers, you must accept this agreement.
InstallShield
< Back
Yes
No

Step 3:
Click the Yes button.


NVIDIA Windows Vista [32-bit] Display Drivers
NVIDIA Windows Vista [32-bit] Display Drivers
Installing driver components...

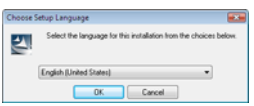
The system is installing the components.


NVIDIA Windows Vista [32-bit] Display Drivers
InstallShield Wizard Complete
The InstallShield Wizard has successfully installed NVIDIA Windows Vista [32-bit] Display Drivers. Before you can use the program, you must restart your computer.
Yes, I want to restart my computer now.
No, I will restart my computer later.
InstallShield
< Back
Finish
Cancel

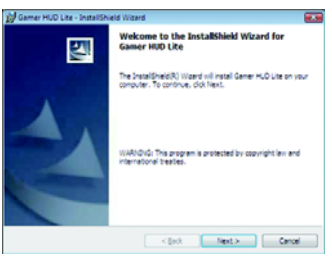
Step 4:
Click the Finish button to restart the computer.
Then the driver installation is completed.

3.1.2. GIGABYTE Gamer HUD Lite on Driver Disk

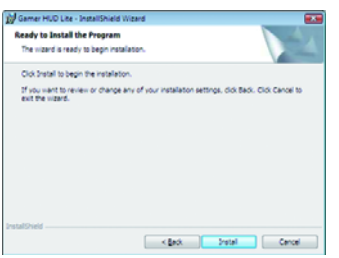
Step 1:
Click the GIGABYTE Gamer HUD Lite item.



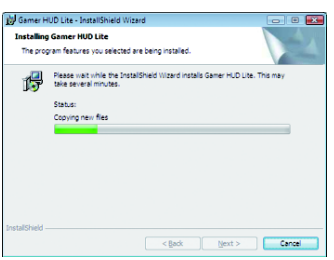
Step 2:
Choose the language for the installation and click the OK button.


Gamer HUD Lite - InstallShield Wizard
Welcome to the InstallShield Wizard for Gamer HUD Lite
The InstallShield(R) Wizard will install Gamer HUD Lite on your computer. To continue, click Next.
WARNING: This program is protected by copyright law and international treaties.
< Back
Next >
Cancel

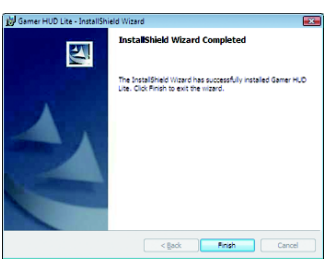
Step 3:
Click the Next button.


Gamer HUD Lite - InstallShield Wizard
Ready to Install the Program
The wizard is ready to begin installation.
Click Install to begin the installation.
If you want to review or change any of your installation settings, click Back. Click Cancel to exit the wizard.
InstallShield
< Back
Install
Cancel

Step 4:
Click the Install button.


Gamer HUD Lite - InstallShield Wizard
Installing Gamer HUD Lite
The program features you selected are being installed.
Please wait while the InstallShield Wizard installs Gamer HUD Lite. This may take several minutes.
Status:
Copying new files
InstallShield
< Back
Next >
Cancel

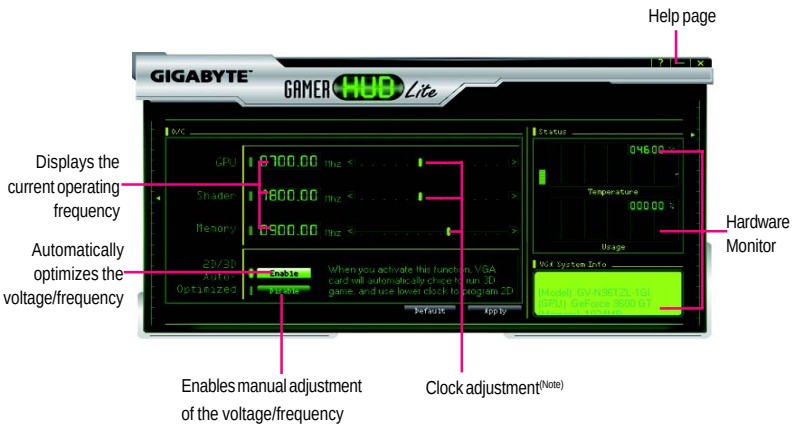
The system is installing the components.


Gamer HUD Lite - InstallShield Wizard
InstallShield Wizard Completed
The InstallShield Wizard has successfully installed Gamer HUD Lite. Click Finish to exit the wizard.
< Back
Finish
Cancel

Step 5:
Click the Finish button. Then the installation of the GIGABYTE Gamer HUD Lite is completed.

GIGABYTE Gamer HUD Lite

The GIGABYTE Gamer HUD Lite allows you to adjust the voltage of your graphics card and the working frequency of the GPU, Shader, and video memory.



Button	Function
Default(Note)	Allows you to load the default settings
Apply(Note)	Allows you to save the values you adjust
Enable	Lets the utility optimize the voltage and GPU/Shader/memory frequency settings
Disable	Allows you to manually configure the voltage and GPU/Shader/Memory frequency settings
Hardware Monitor	Displays the GPU usage and temperature, the GPU usage/thermal curve, and your graphics card information
?	Opens Help page

CAUTION

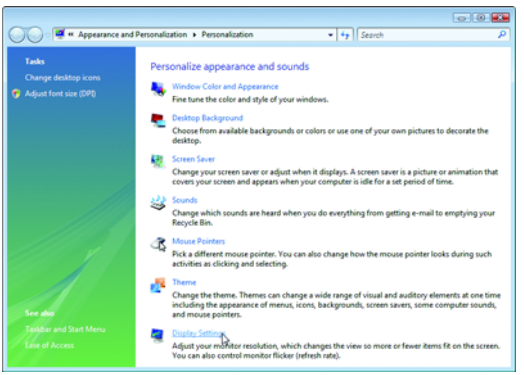
Incorrectly doing overclock/overvoltage may result in damage to your system and reduce the useful life of the system components.

(Note) This item is configurable only if 2D/3D Auto-Optimized is set to Disable.

3.2. Display Properties Pages

Display Settings (Resolutions and Color Quality for Windows)

To access **Display Settings** page, right-click on desktop and select **Personalize**, then the Personalization windows will show up. Select **Display Settings** to adjust the screen resolution and color quality settings.


Appearance and Personalization ▸ Personalization
Search
Tasks
Change desktop icons
Adjust font size (DPI)
Personalize appearance and sounds
Window Color and Appearance
Fine tune the color and style of your windows.
Desktop Background
Choose from available backgrounds or colors or use one of your own pictures to decorate the desktop.
Screen Saver
Change your screen saver or adjust when it displays. A screen saver is a picture or animation that covers your screen and appears when your computer is idle for a set period of time.
Sounds
Change which sounds are heard when you do everything from getting e-mail to emptying your Recycle Bin.
Mouse Pointers
Pick a different mouse pointer. You can also change how the mouse pointer looks during such activities as clicking and selecting.
Theme
Change the theme. Themes can change a wide range of visual and auditory elements at one time including the appearance of menus, icons, backgrounds, screen savers, some computer sounds, and mouse pointers.
Display Settings
Adjust your monitor resolution, which changes the view so more or fewer items fit on the screen. You can also control monitor flicker (refresh rate).
See also
Taskbar and Start Menu
Ease of Access

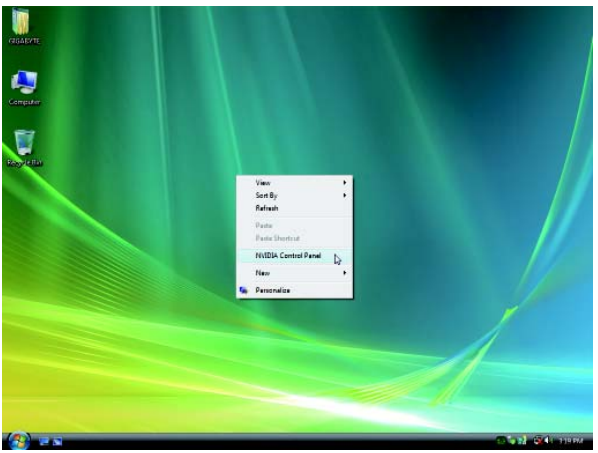
You can move the slider to change the resolution.

You can click the item to change the color quality.

Click the **Advanced** button for advanced settings.

3.3. Accessing NVIDIA Control Panel

After installation of the display driver, right-click on the desktop and select NVIDIA Control Panel. The NVIDIA Control Panel is used to configure all your graphics card settings.



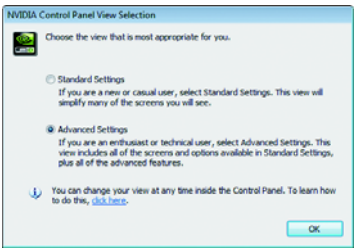
Right-click on the desktop and select NVIDIA Control Panel.

Or you can right-click on the desktop and select Personalize, and then the Control Panel\Appearance Personalization\Personalization window will show up. Select Display Settings. When the Display Settings dialog box appears, click Advanced Settings.

After clicking the Advanced Settings button in Display Settings, you'll see the Generic PnP Monitor and NVIDIA GeForce 9800 GT Properties dialog box. Click the GeForce 9800 GT tab to access the NVIDIA Control Panel.

Generic PnP Monitor and NVIDIA GeForce GTS 250 Properties
Adapter
Monitor
Troubleshoot
Color Management
GeForce GTS 250
NVIDIA
Looking for the NVIDIA Display Control Panel?
All of the NVIDIA control panels have been consolidated into a single application, the NVIDIA Control Panel. It can be launched from the Windows Control Panel or by right-clicking on the Windows desktop.
Start the NVIDIA Control Panel
OK
Cancel
Apply

On the GeForce 9800 GT tab page, click Start the NVIDIA Control Panel to launch the NVIDIA Control Panel.


NVIDIA Control Panel View Selection
Choose the view that is most appropriate for you.
Standard Settings
If you are a new or casual user, select Standard Settings. This view will simplify many of the screens you will see.
Advanced Settings
If you are an enthusiast or technical user, select Advanced Settings. This view includes all of the screens and options available in Standard Settings, plus all of the advanced features.
You can change your view at any time inside the Control Panel. To learn how to do this, click here.
OK

Select the view of the NVIDIA Control Panel that is most appropriate for you.

- Standard Settings
- Advanced Settings

The following pages provide details on configuring advanced settings.

In the NVIDIA Control Panel, select a category to alter specific NVIDIA display settings.

The categories are:

- 3D Settings
- Display
- Video & Television

In the NVIDIA Control Panel, change a view if you want.

The supported modes are:

- Standard
- Advanced
- Custom

3D Settings

Tasks in the 3D Settings pages allow you to do the following:

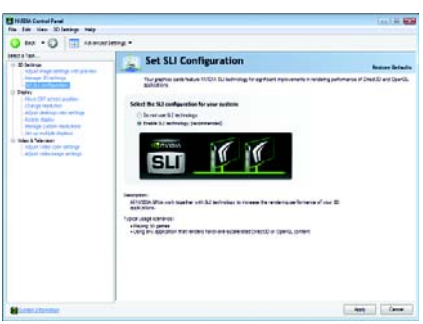
- Change the image and rendering settings of your 3D applications and games that utilize Direct3D and OpenGL technology.
- Override the shipped clocked frequencies of your GPU and GPU memory to increase your GPU performance.
- Assign specific 3D settings to a game so that these settings automatically load when a game is launched.

■ Adjust Image Settings with Preview

If you are unfamiliar with 3D technology or not an advanced graphics user, use the Adjust Image Settings with Preview page to preview any changes you make for improved image quality and rendering.

■ Manage 3D Settings (Note 1)

The Manage 3D Settings page enables you to establish default 3D settings to use for all your Direct3D or OpenGL applications and to establish a unique set of 3D settings for a particular game or application.



■ Set SLI Configuration (Note 2)

SLI technology allows you to use two or more GPUs together. This results in significant improvements in rendering performance and image quality.

Note:

It is recommended that you set to **Enable SLI technology** to enhance the graphics card's performance.

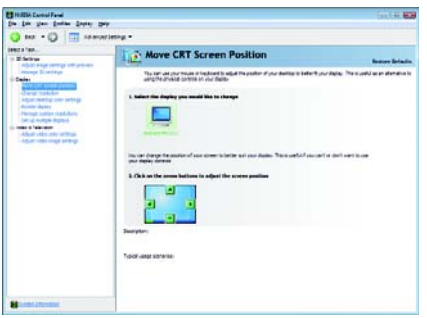
(Note 1) This item is present only in Advanced view mode.

(Note 2) This item will show up when you install two graphics cards with the same model name and from the same vendor.

Display

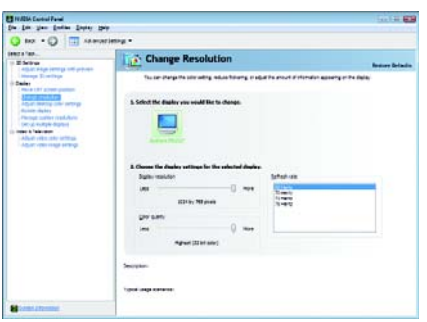
A variety of display features enable you to further manipulate and configure your display settings to optimize the use of your displays. Tasks in the Display pages allow you to do the following:

- Move CRT screen position
- Change resolution
- Adjust desktop color settings
- Rotate display
- Manage custom resolutions (Note)
- Set up multiple displays



■ Move CRT Screen Position

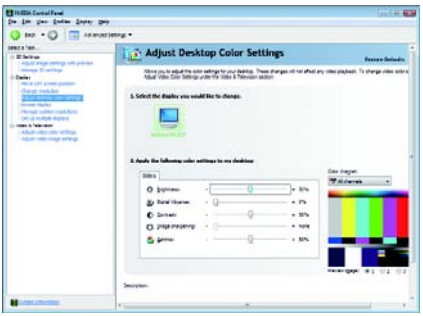
You can use your mouse (by clicking on the arrow keys on this page) or the arrow keys on your keyboard to adjust the position of your desktop to better fit your display. This is a useful alternative to using the controls (buttons) on your actual physical display.



■ Change Resolution

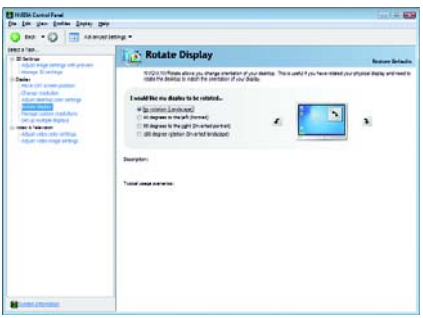
Using the Change Resolution controls, you can change the color setting, reduce screen flickering, or adjust the amount of information appearing on your display.

(Note) This item is present only in Advanced view mode.



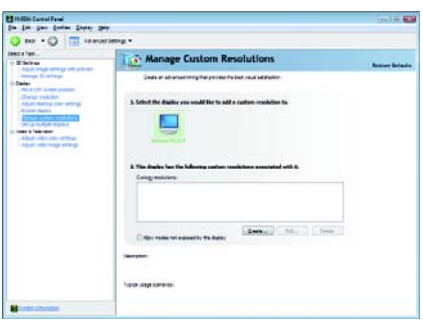
■ Adjust Desktop Color Settings

Use this page to set the contrast, sharpness, and color depth (Digital Vibrance) of the images on your desktop. These changes will not affect any video playback. To change video color settings, go to Adjust Video Color Settings under the Video and TV section from the Start page.



■ Rotate Display

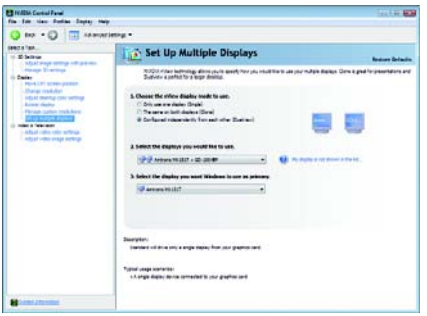
The NVIDIA Rotate features enable you to change the orientation of your desktop to portrait, landscape, and inverted modes. This is useful if you have rotated your physical display and need to rotate the desktop to match the orientation of your display.



■ Manage Custom Resolutions (Note)

If you are an advanced user, you can create custom timing modes with the width, height, bit-color depth, and the refresh rate etc. The Advanced Timing page enables you to adjust timings for your graphics card in order to support a variety of different display timings for ultimate flexibility for analog CRT and DVI connections. You can use the advanced Change Resolution Attributes page to view custom display modes you have saved in the Create Custom Resolutions page.

(Note) This item is present only in Advanced view mode.

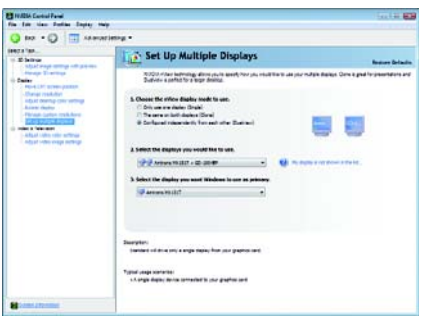


■ Set Up Multiple Displays

NVIDIA nView technology enables you to view your desktop in one of several multi-display modes to make the best use of the displays (monitors) that are connected to your computer.

Dual-Monitor Setup

You can set the display to output from two monitors on the Set Up Multiple Displays page.



Select your preferred nView display modes here.

- Only use one display (Single)
- The same on both display (Clone)
- Configured independently from each other (Dualview)
- As one large horizontal desktop (Horizontal span) (Note)
- As one large vertical desktop (Vertical span) (Note)

(1) The same on both display (Clone)

Clone mode indicates that both displays in the display pair show images of the same desktop.

Clone Mode

(2) Configured independently from each other (Dualview)

Dualview mode indicates that both displays in the display pair function as one virtual desktop. Unlike Horizontal Span or Vertical Span mode, Dualview treats each display as a separate device. This means that the taskbar will not be stretched across displays and 3D applications are not accelerated as efficiently as when the application spans displays.

Dualview Mode

(Note) This item is present only in Windows XP.

(3) As one large horizontal desktop (Horizontal span) (Note 1)

Horizontal Span mode indicates that both displays in the display pair function as one wide virtual desktop. The width of each display is half the width of the total virtual desktop width.

Horizontal Span Mode

(4) As one large vertical desktop (Vertical span) (Note 1)

Vertical Span mode indicates that both displays in the display pair function as one tall virtual desktop. The height of each display is half the height of the total virtual desktop height.

Vertical Span Mode

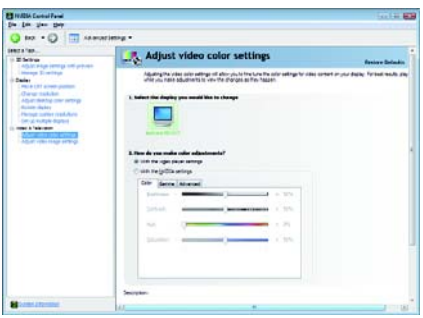
Display Matrix	Model	GV-N98TGR-512I
	CRT+HDMI	Yes
	CRT+DVI	Yes
	DVI+HDMI	Yes
	DVI+HDMI+CRT	No
	DVI +DVI (Note 2)	Yes
	CRT+CRT (Note 3)	Yes

(Note 1) This item is present only in Windows XP.
(Note 2) By an HDMI-to-DVI adapter.
(Note 3) By a DVI-to-D-Sub adapter.

Video & Television

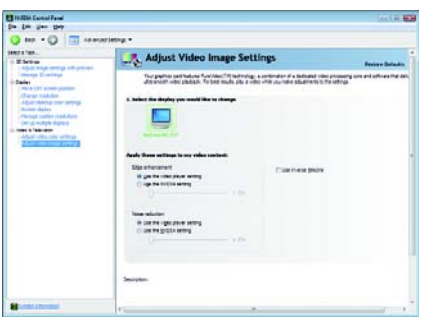
Video and television features are similar to those for analog for optimal viewing. Tasks in the Video & Television pages allow you to do the following:

- Adjust your television picture quality and video color settings for the best possible viewing in its environment.
- Change the position and size of the desktop video to best fit your television screen.



■ Adjust Video Color Settings

Use the controls on this page to fine tune the color settings for video content on your display. Select one of the test images to monitor your changes. For best results, play a video while you make adjustment to view the changes as they happen.



■ Adjust Video Image Settings

Use the controls on this page to fine tune the image settings for video content on your display. You can choose to use inverse telecine, adjust edge sharpness, or apply noise filtering. For best results, play a video while you make adjustment to view the changes as they happen.

Note:

Support for some features under Windows Vista is in development and may not be available with your ForceWare graphics driver version. Consult the release notes for updated information on supported features.

4. Troubleshooting Tips

The following troubleshooting tips may help if you experience problems. Contact your dealer or GIGABYTE for more advanced troubleshooting information.

- Check that the card is seated properly in the PCI Express x16 slot.
- Ensure that the display cable is securely fastened to the card's display connector.
- Make sure that the monitor and computer are plugged in and receiving power.
- If necessary, disable any built-in graphics capabilities on your motherboard. For more information, consult your computer's manual or manufacturer.
  (NOTE: Some manufacturers do not allow the built-in graphics to be disabled or to become the secondary display.)
- Make sure you selected the appropriate display device and graphics card when you install the graphics driver.
- Restart your computer.
  Press <F8> on your keyboard after system starts up. When the Windows Advanced Options Menu appears, select Safe Mode and press <Enter>.
  After getting into Safe Mode, in Device Manager check whether the driver for the graphics card is correct.
- For more assistance, use the Troubleshooting Guide located in the Windows Help or contact your computer manufacturer.
- If you are not able to find the desired monitor color/resolution settings:
  The color and screen resolution options available for selection depend on the graphics card being installed.

If necessary, adjust your monitor's setting using monitor's adjust panel to make the screen look focused, crisp, and sharp. (Please refer to the monitor's manual.)

5. Appendix

5.1. How to Reflash the BIOS in MS-DOS Mode

1. Extract the downloaded Zip file to your hard disk(s) or floppy disk. This procedure assumes drive A.
2. Restart the computer in MS-DOS mode. (You may need a startup disk to restart the computer in MS-DOS mode.)
3. Change the command prompt to A:\>.
4. To back up the current BIOS, at the A:\> prompt, type `[BIOS flash utility name] -s [BIOS file name]` (example: gvf19 -s n98tgr5i.F1) and press Enter.
5. To flash BIOS, at the A:\> prompt, type `[BIOS flash utility name] -p [BIOS file name]` (example: gvf19 -p n98tgr5i.F2) and press Enter.
6. Wait until it's done, then restart your computer.

5.2. Resolutions and Color Depth Tables

GeForce 9800 GT Single Display Standard Modes

Display Screen Resolution	Refresh Rate (Hz)	Color Depth (bpp) 8bpp(256 color) Standard mode	16bpp(65K color) High mode	32bpp(16.7M) True mode
320 x 200	60~75	✓	✓	✓
320 x 240	60~75	✓	✓	✓
400 x 300	60~75	✓	✓	✓
480 x 360	60~75	✓	✓	✓
512 x 384	60~75	✓	✓	✓
640 x 400 (16:10)	60~75	✓	✓	✓
640 x 480	60~240	✓	✓	✓
720 x 480	60	✓	✓	✓
720 x 576	50~60	✓	✓	✓
800 x 600	60~240	✓	✓	✓
848 x 480	60~240	✓	✓	✓
960 x 600 (16:10)	60~240	✓	✓	✓
1024 x 768	60~200	✓	✓	✓
	240	✓	✓	X
1088 x 612 (16:9)	60~200	✓	✓	✓
	240	✓	✓	X
1152 x 864	60~170	✓	✓	✓
	200	✓	✓	X
1280 x 720 (16:9)	60~150	✓	✓	✓
	170	✓	✓	X
1280 x 768	60~150	✓	✓	✓
	170	✓	✓	X
1280 x 800	60~150	✓	✓	✓
	170	✓	✓	X
1280 x 960	60~150	✓	✓	✓
	170	✓	✓	X
1280 x 1024	60~150	✓	✓	✓
	170	✓	✓	X
1360 x 768	60~150	✓	✓	✓
	170	✓	✓	X
1600 x 900 (16:9)	60~120	✓	✓	✓
	140~150	✓	✓	X
1600 x 1024	60~100	✓	✓	✓
	120	✓	✓	X

To be continued...

Display Screen Resolution	Refresh Rate (Hz)	Color Depth (bpp) 8bpp(256 color) Standard mode	16bpp(65K color) High mode	32bpp(16.7M) True mode
1600 x 1200	60~100	✓	✓	✓
	120	✓	✓	X
1920 x 1080 (16:9)	60~85	✓	✓	✓
	100	✓	✓	X
1920 x 1200 (16:10)	60~85	✓	✓	✓
	100	✓	✓	X
1920 x 1440	60~85	✓	✓	✓
2048 x 1536	60~85	✓	✓	✓
2560 x 1600 (Dual-Link)	60	✓	✓	✓

* This table is for reference only. The actual resolutions supported depend on the monitor you use.

5.3. Regulatory Statements

Regulatory Notices

This document must not be copied without our written permission, and the contents there of must not be imparted to a third party nor be used for any unauthorized purpose. Contravention will be prosecuted. We believe that the information contained herein was accurate in all respects at the time of printing. GIGABYTE cannot, however, assume any responsibility for errors or omissions in this text. Also note that the information in this document is subject to change without notice and should not be construed as a commitment by GIGABYTE.

Our Commitment to Preserving the Environment

In addition to high-efficiency performance, all GIGABYTE motherboards fulfill European Union regulations for RoHS (Restriction of Certain Hazardous Substances in Electrical and Electronic Equipment) and WEEE (Waste Electrical and Electronic Equipment) environmental directives, as well as most major worldwide safety requirements. To prevent releases of harmful substances into the environment and to maximize the use of our natural resources, GIGABYTE provides the following information on how you can responsibly recycle or reuse most of the materials in your "end of life" product.

Restriction of Hazardous Substances (RoHS) Directive Statement

GIGABYTE products have not intended to add and safe from hazardous substances (Cd, Pb, Hg, Cr+6, PBDE and PBB). The parts and components have been carefully selected to meet RoHS requirement. Moreover, we at GIGABYTE are continuing our efforts to develop products that do not use internationally banned toxic chemicals.

Waste Electrical & Electronic Equipment (WEEE) Directive Statement

GIGABYTE will fulfill the national laws as interpreted from the 2002/96/EC WEEE (Waste Electrical and Electronic Equipment) directive. The WEEE Directive specifies the treatment, collection, recycling and disposal of electric and electronic devices and their components. Under the Directive, used equipment must be marked, collected separately, and disposed of properly.

WEEE Symbol Statement

The symbol shown below is on the product or on its packaging, which indicates that this product must not be disposed of with other waste. Instead, the device should be taken to the waste collection centers for activation of the treatment, collection, recycling and disposal procedure. The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste equipment for recycling, please contact your local government office, your household waste disposal service or where you purchased the product for details of environmentally safe recycling.

- When your electrical or electronic equipment is no longer useful to you, "take it back" to your local or regional waste collection administration for recycling.
- If you need further assistance in recycling, reusing in your "end of life" product, you may contact us at the Customer Care number listed in your product's user's manual and we will be glad to help you with your effort.

Finally, we suggest that you practice other environmentally friendly actions by understanding and using the energy-saving features of this product (where applicable), recycling the inner and outer packaging (including shipping containers) this product was delivered in, and by disposing of or recycling used batteries properly. With your help, we can reduce the amount of natural resources needed to produce electrical and electronic equipment, minimize the use of landfills for the disposal of "end of life" products, and generally improve our quality of life by ensuring that potentially hazardous substances are not released into the environment and are disposed of properly.

China Restriction of Hazardous Substances Table

The following table is supplied in compliance with China's Restriction of Hazardous Substances (China RoHS) requirements:

关于符合中国《电子信息产品污染控制管理办法》的声明
Management Methods on Control of Pollution from Electronic Information Products
(China RoHS Declaration)

产品中有毒有害物质或元素的名称及含量
Hazardous Substances Table

部件名称(Parts)	有毒有害物质或元素(Hazardous Substances)					
	铅(Pb)	汞(Hg)	镉(Cd)	六价铬(Cr(VI))	多溴联苯(PBB)	多溴二苯醚(PBDE)
PCB板 PCB	○	○	○	○	○	○
结构件及风扇 Mechanical parts and Fan	×	○	○	○	○	○
芯片及其他主动零件 Chip and other Active components	×	○	○	○	○	○
连接器 Connectors	×	○	○	○	○	○
被动电子元器件 Passive Components	×	○	○	○	○	○
线材 Cables	○	○	○	○	○	○
焊接金属 Soldering metal	○	○	○	○	○	○
助焊剂，散热膏，标签及其他耗材 Flux, Solder Paste, Label and other Consumable Materials	○	○	○	○	○	○

○：表示该有毒有害物质在该部件所有均质材料中的含量均在SJ/T11363-2006标准规定的限量要求以下。
Indicates that this hazardous substance contained in all homogenous materials of this part is below the limit requirement SJ/T 11363-2006

×：表示该有毒有害物质至少在该部件的某一均质材料中的含量超出SJ/T11363-2006标准规定的限量要求。
Indicates that this hazardous substance contained in at least one of the homogenous materials of this part is above the limit requirement in SJ/T 11363-2006

对销售之日的所受售产品，本表显示我公司供应链的电子信息产品可能包含这些物质。注意：在所售产品中可能会也可能不会含有所有所列的部件。
This table shows where these substances may be found in the supply chain of our electronic information products, as of the date of the sale of the enclosed products. Note that some of the component types listed above may or may not be a part of the enclosed product.